

Application Number 10/771,641  
Responsive to Office Action mailed January 26, 2007

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**REMARKS**

This Amendment is responsive to the Office Action dated January 26, 2007. Applicant has amended claims 1, 4, 31, 39, 40, 41, 43, 75, and 77, and added claims 80-82. Claims 1-82 are pending.

**Restriction Requirement**

As the Office Action indicated, the restriction requirement set forth in the Office Action mailed on October 11, 2006 has been withdrawn.

**Claim Rejection Under 35 U.S.C. § 112**

In the Office Action, claims 3-11, 22, 24, 27, 28, 30, 38, 42-50, 58, 60, 63, 64, 74 and 76-78 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Examiner found that "it is unclear what is meant by 'the practitioner adjusts the orthodontic appliance.'"<sup>1</sup> Claims 4, 43, and 77 as originally presented recited "the practitioner adjusts the orthodontic appliance." With the present Amendment, Applicant has amended claim 4, 43, and 77 to clarify that the practitioner adjusts the placement of the orthodontic appliance within a three-dimensional (3D) environment. Support for the amendments to claims 4, 43, and 77 is found throughout Applicant's originally filed disclosure, including at paragraph [0052]. Applicant submits that claim 4, 43, and 77, as amended, particularly point out and distinctly claim the subject matter, as required by 35 U.S.C. § 112, second paragraph, and respectfully requests withdrawal of the rejection.

The Examiner also rejected claims 3-11, 22, 24, 27, 28, 30, 38, 42-50, 58, 60, 63, 64, 74 and 76-78 under 35 U.S.C. § 112, second paragraph on the basis that "it is unclear what is meant by . . . reference to orientation of the planar guide of the orthodontic appliance as the orthodontic appliance is not positively claimed in the method steps or the system."<sup>2</sup> The Examiner further reasoned that "[i]f it were to be positively claimed, it would not be clear as to what is a midsagittal plane, a midlateral plane, a midfrontal plane, occlusal-gingival axis of the orthodontic

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<sup>1</sup> Office Action at page 2, item 2.

<sup>2</sup> *Id.*

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appliance, i.e. there is no structure given to the orthodontic appliance to identify the planes and axis.”<sup>3</sup> Applicant respectfully submits that the claims as originally presented are definite and meet the requirements of 35 U.S.C. § 112, second paragraph.

As an initial matter, Applicant notes that none of Applicant’s claims recite “orientation of the planar guide to a plane of the orthodontic appliance.” Applicant’s claim 3 recites “generating the planar guide within the 3D environment relative to a coordinate system associated with the orthodontic appliance.” In addition, Applicant’s claim 5 recites “rendering the mesial planar guide and a distal planar guide parallel to a midsagittal plane of the orthodontic appliance.” For purposes of addressing the rejection of claims 3, 5, 6-11, and 30 under 35 U.S.C. § 112, second paragraph, Applicant will refer to claims 3 and 5.

M.P.E.P. § 2171 provides guidance as to the requirements of 35 U.S.C. § 112, second paragraph, and states that a claim is definite when “the scope of the claim is clear to a hypothetical person possessing the ordinary level of skill in the pertinent art.” Applicant believes the scope of claim 3 is clear. Claim 3 recites a method that includes “generating the planar guide within the 3D environment relative to a coordinate system associated with the orthodontic appliance.” The “orthodontic appliance” is not inferentially claimed, as the Office Action suggests<sup>4</sup>. Quite the contrary, claim 3 positively and explicitly recites the function of generating the planar guide relative to a coordinate system of the orthodontic appliance. Claim 3 does not imply the orthodontic appliance relates to the method, but explicitly recites a method in which a planar guide is generated within a 3D environment relative to a particular coordinate system, i.e., a coordinate system of an orthodontic appliance. Applicant’s claim 3 defines the necessary functions of the method with, at a minimum, a reasonable degree of particularity and distinctness.<sup>5</sup>

With respect to claim 5, Applicant submits that requirement of “rendering the mesial planar guide and a distal planar guide parallel to a midsagittal plane of the orthodontic appliance” also explicitly and positively recites a step for the claimed method. The Office Action alleged that because there is no structure given to the orthodontic appliance, there is no way to identify a

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<sup>3</sup> *Id.*

<sup>4</sup> See *id.* at page 3, item 4.

<sup>5</sup> M.P.E.P. § 2173.02 provides that that in order to meet the requirements of 35 U.S.C. § 112, second paragraph, a claim must define the patentable subject matter with a reasonable degree of particularity and distinctness.

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[midsagittal] plane.<sup>6</sup> Applicant respectfully disagrees. Again, the benchmark for determining whether a claim is definite is whether it defines the invention with a reasonable degree of particularity and distinctness<sup>7</sup>. Claim 5 positively recites use of a midsagittal plane as part of a method. The intention of claim 5 is not to claim a midsagittal plane of an orthodontic appliance, but to claim a method that comprises rendering a mesial planar guide and a distal planar guide parallel to a midsagittal plane of the orthodontic appliance. Thus, regardless of the actual structure of the orthodontic appliance, claim 5 positively, not inferentially, recites a method that includes rendering planar guides parallel to a midsagittal plane of an orthodontic appliance.

Moreover, Applicant submits that the scope and meaning of "midsagittal plane" would be clear to a "hypothetical person possessing the ordinary level of skill in the pertinent art."<sup>8</sup> Claim 5 explicitly states that in a method, planar guides are rendered parallel to a midsagittal plane of the orthodontic appliance. Terms such as mesial, distal and midsagittal are well-known, common terms within the orthodontics industry. For at least this reason, Applicant respectfully submits that the method recited in claim 5 is definite and claim 5 meets the requirements of 35 U.S.C. § 112, second paragraph.

For the same reasons given above with respect to claims 3 and 5, claims 6-11 and 30 are definite methods that are clearly defined, and the functions that utilize each plane or axis recited within claims 6-11 are clearly and positively recited as a part of the method. Similarly, claims 27 and 28 recite methods explicitly referring to an angulation associated with the orthodontic appliance. No further structure needs to be provided to the orthodontic appliance in each of claims 3, 5, 6-11, 27, and 28 because each of those method claims explicitly recites functions performed with, at a minimum, a reasonable degree of particularity and distinctness to the method<sup>9</sup>.

Moreover, for similar reasons give above with respect to the method claims 3, 5-11, and 30, no further structure need be recited to identify the coordinate system recited in claims 42 or 76, the planes or axes recited in claims 44-50 and 78 or the angulation of the orthodontic appliance recited in claims 63 and 64. For example, claim 42 recites a system that comprises a

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<sup>6</sup> Office Action at page 2, item 2.

<sup>7</sup> *Id.*

<sup>8</sup> M.P.E.P. § 2171.

<sup>9</sup> M.P.E.P. § 2173.02.

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guide control module that generates a planar guide within a 3D environment based on a coordinate system associated with an orthodontic appliance. Claim 42 defines a system with, at a minimum, a reasonable degree of particularity and distinctness<sup>10</sup> and positively recites the structural requirements of a guide control software module executing on a computing device to perform the function of generating the planar guide relative to a coordinate system of the orthodontic appliance. Neither the orthodontic appliance nor its coordinate system are inferentially claimed, rather the required elements set forth by claim 42 are the guide control software module executing to perform the recited function. As another example, claim 44 explicitly recites the structural requirements of a guide control software module executing on a computing device to perform the function of generating a distal planar guide parallel to a midsagittal plane of the orthodontic appliance. These are specific features of the guide control software module positively recited in claim 44. Similar to claim 5, the intention of claim 44 is not to claim a midsagittal plane of an orthodontic appliance, but to claim a system that comprises a guide control module that generates planar guides parallel to a midsagittal plane of the orthodontic appliance. Regardless of the actual structure of the orthodontic appliance, claim 44 positively, not inferentially, recites the features of the guide control software module, thereby rendering claim 44 definite.

Claims 22, 24, 58, and 60 were also rejected under 35 U.S.C. § 112, second paragraph. Claims 22 and 24 each recite a method that includes a step of storing some attribute related to a planar guide. In claim 22, the method explicitly includes storing attributes for different types of planar guides with respect to different types of orthodontic appliances. Applicant submits that claim 22 is definite and particularly points out and distinctly claims a method, where the "different types of orthodontic appliances" specifies the type of planar guide data that is stored using the method. The method particularly points out that the planar guide data relates to "different types of orthodontic appliances." In claim 24, the method explicitly recites a method that includes storing planar guide data, which comprises storing attributes that specify distances for each of the different types of planar guides with respect to at least one tooth of the dental arch, a different one of the planar guides, and the orthodontic appliance. Again, the "orthodontic

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<sup>10</sup> M.P.E.P. § 2173.02 provides that that in order to meet the requirements of 35 U.S.C. § 112, second paragraph, a claim must define the patentable subject matter with a reasonable degree of particularity and distinctness.

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appliance" is positively recited in claim 24 as part of a method, and defines the planar guide data that is stored using the method.

Claims 58 and 60 each recite a system comprising a database, and specify the type of planar guide data that the database stores. Just as with claims 22 and 24, claims 58 and 60 positively recite features of the database as storing attributes for different types of orthodontic appliances and orthodontic appliance, respectively. These claims 22, 24, 58, and 60 do not claim "different types of orthodontic appliances" or "orthodontic appliance" per se, but rather clearly and positively define the planar guide data that is stored via the respective method or system.

For the foregoing reasons, claims 4, 43, and 77 as amended, and claims 3, 5-11, 22, 24, 27, 28, 30, 38, 42, 44-50, 58, 60, 63, 64, 74, 76, and 78 meet the requirements of 35 U.S.C. § 112, second paragraph. Withdrawal of this rejection is respectfully requested.

**Claim Rejection Under 35 U.S.C. §§ 102(e) & 103(a)**

In the Office Action, claims 1-13, 18, 19, 27, 28, 31-35, 37-55, 67-71 and 73-78 were rejected under 35 U.S.C. § 102(b) as being anticipated by Chapoulaud et al. (U.S. Patent Application Publication No. 2002/0028417). Claims 14-17, 20-26, 36, 56-64 and 72 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chapoulaud et al. In addition, claims 29, 30, 65, 66 and 79 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chapoulaud et al. in view of Kopelman et al. (U.S. Patent Application Publication No. 2003/014509). Applicant respectfully traverses the rejections to the extent such rejection may be considered applicable to the amended claims. The cited references fail to disclose or suggest each and every feature of the claimed invention, as required by 35 U.S.C. §§ 102(b) and 103(a), and provide no teaching that would have suggested the desirability of modification to include such features.

While Applicant maintains that the claims as originally presented are patentable over Chapoulaud et al., Applicant has amended independent claims 1, 39, and 75 to expedite prosecution of the application. Independent claim 1 has been amended to recite a method that comprises the step of computing a location of a planar guide within the 3D environment based on a placement of an orthodontic appliance within the 3D environment relative to a dental arch. Claim 39 has been amended to recite a system that comprises a guide control module that

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computes a location of a planar guide within the 3D environment based on a placement of an orthodontic appliance within the 3D environment relative to a dental arch. Finally, claim 75 has been amended to recite a computer-readable medium that comprises instructions for causing a programmable processor to compute a location of a planar guide based on a placement of an orthodontic appliance within a 3D environment relative to a dental arch.

Chapoulaud et al. fails to disclose or suggest each and every feature of the claimed invention, as required by 35 U.S.C. §§ 102(b) and 103(a), and provides no teaching that would have suggested the desirability of modification to include such features. For example, Chapoulaud et al. fails to disclose a method that includes computing a location of a planar guide based on a placement of an orthodontic appliance within a 3D environment relative to a dental arch and displaying the planar guide within the 3D environment as a visual aid to a practitioner in adjusting the placement of the orthodontic appliance relative to the dental arch, as recited by claim 1.

In support of the rejection of the claims, the Office Action stated that Chapoulaud et al. teaches a planar guide and relied on FIG. 4 of Chapoulaud et al. as showing a planar guide.<sup>11</sup> However, FIG. 4 merely illustrates a positioning grid represented by a plurality of lines, rather than a planar guide.<sup>12</sup> The individual lines of the positioning grid in no way define a guide as a plane, and accordingly, the positioning grid is not a planar guide, as required by claim 1. Nothing in Chapoulaud et al. suggests that the space between the lines is a part of the positioning grid or that the grid defines a plane within the 3D environment. Chapoulaud et al. is concerned with the grid lines themselves, and does not contemplate a planar guide. For example, Chapoulaud et al. states that, "the grid lines intersect the boundaries of the mandibular trough. These boundaries B<sub>B</sub> and B<sub>L</sub> can be selected by pattern recognition software, manually by the operator 28 clicking with a pointing device at the grid and boundary intersection points . . ."<sup>13</sup>

Furthermore, even if the positioning grid was a planar guide, a point with which Applicant respectfully disagrees, Chapoulaud et al. does not teach displaying the planar guide as a visual aid to a practitioner in adjusting the placement of the orthodontic appliance relative to the dental arch, as required by claim 1 as amended. Instead, the Chapoulaud et al. positioning

<sup>11</sup> Office Action at page 3, item 4.

<sup>12</sup> Chapoulaud et al. at paragraph [0076].

<sup>13</sup> *Id.*

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grid is used to calculate various dimensions, such as midpoints between labial and lingual limits of a cortical bone of a patient.<sup>14</sup> In addition, when viewed in the context provided the specification as a whole, it appears that FIG. 4 illustrates the positioning grid "to generate a function defining the mandibular skeletal archform," and ultimately, to refine the boundaries of each tooth so that the tooth images can be independently moved.<sup>15</sup> While Chapoulaud et al. discusses adjusting the torque, tip and rotation of brackets<sup>16</sup>, Chapoulaud et al. does not teach or even suggest using the positioning grid as a visual aid to the practitioner in adjusting the placement of the bracket. Chapoulaud et al. only teaches and suggests using the positioning grid to define the boundaries of each tooth image relative to other teeth so that individual tooth images can be manipulated. Furthermore, Chapoulaud et al. only teaches use of the positioning grid during the phase in which the boundaries of each tooth image are determined, and the positioning grid is not even displayed when an orthodontic appliance is displayed.<sup>17</sup>

Furthermore, Chapoulaud et al. does not teach computing a location of the grid based on a placement of an orthodontic appliance with the 3D environment relative to a dental arch, as required by amended claim 1. Quite the contrary, Chapoulaud et al. teaches that the grid is initially placed relative to the digital bitmap of a dental arch itself.<sup>18</sup> The location of the grid can then be adjusted by an operator, such as by clicking on the grid and manually moving points of the grid.<sup>19</sup> In contrast, claim 1 positively requires the step of computing a location of the grid based on a placement of an orthodontic appliance. Chapoulaud et al. does not teach a positioning grid whose location is calculated based on the placement of an orthodontic appliance. Indeed, the Chapoulaud et al. grid appears to be independently movable without regard to the placement of an orthodontic appliance, or even the placement of the dental arch.

Applicant's independent claim 39 as amended recites a system comprising a guide control module that computes a location of a planar guide based on a placement of an orthodontic appliance within the 3D environment relative to the dental arch, and a user interface that displays the planar guide as a visual aid to a practitioner in adjusting the placement of an orthodontic

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<sup>14</sup> *Id.*

<sup>15</sup> *Id.* at paragraphs [0076] and [0077].

<sup>16</sup> *Id.* at paragraph [0091].

<sup>17</sup> *See id.* at FIG. 5E.

<sup>18</sup> *Id.* at paragraph [0076].

<sup>19</sup> *Id.*

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appliance relative to the dental arch. Chapoulaud et al. also fails to teach or suggest these elements.

Applicant's independent claim 75 as amended recites a computer-readable medium comprising instructions for causing a programmable processor to compute a location of a planar guide based on a placement of an orthodontic appliance within a 3D environment relative to a dental arch, and display the planar guide within the 3D environment as a visual aid to a practitioner in adjusting the placement of an orthodontic appliance relative to the tooth. Chapoulaud et al. also fails to teach or suggest these elements.

All claims depending from independent claims 1, 39, and 75 are also patentable over Chapoulaud et al. However, Applicant also notes that dependent claims 2-38, 40-74, and 76-79 are also distinguishable over Chapoulaud et al. Applicant addresses some of the dependent claims below for purposes of illustration. Claim 4 depends from claim 1 and specifies that displaying a planar guide includes automatically adjusting the location and orientation of the planar guide within the 3D environment as the practitioner adjusts the placement of the orthodontic appliance with respect to the tooth within the 3D environment. As discussed above with respect to claim 1, the positioning grid in Chapoulaud et al. may be moved independently of, i.e., without relation to, any orthodontic appliances or teeth. Accordingly, Chapoulaud et al. does not teach or suggest a method in which the grid is automatically adjusted as the practitioner adjusts the placement of an orthodontic appliance.

Claims 5-11 each depend from claim 1 and recite methods that specify types of planar guides, such as mesial planar guides, occlusal planar guides, midlateral planar guides, midfrontal planar guides, and midsagittal planar guides. Chapoulaud et al. does not teach planar guides, much less different types of planar guides. Furthermore, Chapoulaud et al. does not teach or suggest rendering planar guides parallel to a plane of an orthodontic appliance, as recited in dependent claims 5, 6, 8, 9, 10, and 11, which recite one of a midsagittal plane, midlateral plane or a midfrontal plane of the orthodontic appliance.

Kopelman et al. fails to overcome the basic deficiencies in Chapoulaud et al. identified above. For at least these reasons, the Examiner has failed to establish a prima facie case of nonpatentability of Applicant's independent claims 1, 39, and 75, and claims 2-38, which depend from claim 1, claims 40-74, which depend from claim 39, and claims 76-79, which depend from



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claim 75 under 35 U.S.C. §§ 102(a) and 103(a). Withdrawal of these rejections is respectfully requested.

**New Claims:**

Applicant has added claims 80-82 to the pending application to clarify that in each independent claims 1, 39, and 75, a location of a planar guide is calculated based on the placement of an orthodontic appliance within the 3D environment relative to the dental arch. With respect to claims 80-82, the applied references fail to disclose or suggest further calculating an orientation of the planar guide based on the placement of an orthodontic appliance, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed inventions. No new matter has been added by the new claims.

**CONCLUSION**

All claims in this application are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of all pending claims. Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

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